

grapher to an explorer in a forest "who finds no open way to travel, but must laboriously hunt for his specimens . . . as they lie scattered, unclassified, and, all too often, concealed." These words were spoken in 1895, but now the two bulky volumes before us show that the biologist need not lose hope in the ever thickening jungle of literature. They form a thoroughly competent biological record for two years, and, whatever may be their defects in detail, they deserve a hearty welcome. If Prof. Delage's undertaking is supported as it should be, not only by subscribers, but by co-operators, it should do much in the future to widen the interest of naturalists in the great problems of biology, to raise the standard of biological scholarship, and to curb the impatience of those who hasten to ill-advised reiteration of tales many times told.

This "biological record" does not compete with its seniors—the *Zoological Record*, the Naples *Jahresbericht*, and others akin, nor with the Zürich Concilium over which Dr. Field presides, nor with the *Journal of the Royal Microscopical Society*, the *Zoologisches Centralblatt*, and their like, for, as the title indicates, it aims at recording and summarising and appreciating those papers which deal with or have a bearing on *general biological problems*. It is a record for biologists, not for systematists, anatomists, physiologists, embryologists, and palæontologists, who have their own "resources"—though none would be the worse of availing himself of this also.

The task is somewhat similar to that which has been attempted for many years in the first part (General Subjects) of the *Zoological Record*, and in the corresponding portion of the Naples *Jahresbericht*; but there are several notable differences. The meshes of the net used by *L'Année Biologique* are finer than in the others; it is botanical and anthropological as well as zoological; and there are more or less adequate signed summaries of all the important papers recorded. On the other hand, it is only fair to notice that the Records which are issued from the Zoological Society of London, by the Naples station, and by the botanists, come much more nearly up to time. Thus, we must be ungrateful enough to observe that the third volume of *L'Année Biologique* dealing with 1897 is not yet to hand; and it is of course obvious that the editors of the later records have the advantage, which no one grudges, of being able to utilise the labours of their more up-to-date predecessors.

What the editors understand by the term "biological" is at once seen from the table of contents, which includes about a score of subjects: the cell; the sex-cells and fertilisation; parthenogenesis; asexual reproduction; ontogeny; teratogeny; regeneration; grafting; sex; polymorphism, metamorphosis, and alternation of generations; latent characters; correlation; death, immortality, and the germ-plasm; general morphology and physiology; heredity; variation; origin of species; geographical distribution; nervous system and mental functions; and general theories. It is easy to criticise, but it seems to us that this classification is unwieldy, and it has certainly led to an unnecessary amount of repetition. We notice, for instance, at least one case where the same paper has been summarised twice at considerable length by different recorders, which, however interesting, is luxurious.

Prof. Yves Delage and Dr. Georges Poirault deserve the gratitude of all biologists for their monumental record, though perhaps only bibliographers will adequately appreciate the magnitude of the labour involved. It is of course a co-operative work, organised from the contributions of a large body of workers in Europe and America, and, as our own share has been a minimal one, we are bold to say that the co-operators also deserve some gratitude for their labour of love. An interesting and valuable feature is the general discourse which precedes most of the sections, sometimes rising to the dimensions of a comprehensive essay, as in the case of correlation, phagocytosis, and geographical distribution. There seems, indeed, just a hint of overdoing this part of the record.

Every one will agree that the prime and indispensable virtue of any bibliography is accuracy, and in this respect we must in honesty say that there is still room for improvement in *L'Année Biologique*. We took the trouble to correct three pages in the first volume, and the result is certainly not beautiful to look upon. We hasten, however, to add that the inaccuracies affect the letter rather than the spirit of the bibliographer's laws, and that the second volume has attained to a high standard. We ourselves well know how insidiously mistakes creep in, and we are in no mood for fault-finding, yet it must be remembered that accuracy comes first in the criteria of bibliographic work. With a task so huge, the only hope is that there may be more generous co-operation. Surely some of those who make game of a busy recorder's mistakes might sometimes remember that amelioration for the future will be furthered by the simple device of sending in copies of their works to be at hand both in the compilation and in the proof-reading of the record.

Since the volumes before us were published, we have thoroughly tested their usefulness, and, frankly, we cannot but be surprised if every serious biologist does not agree with us in calling them indispensable. As for those gay knights-errant who care not for any of these bibliographies, we can only regret that they thereby do injustice to their genius.

And, finally, we should say in welcoming this biological record, that as there is a social as well as a scientific aspect of bibliography, it seems to us a matter for genuine congratulation that the editors have endeavoured to place their record upon an international basis—an endeavour which will, we hope, eventually have further development in an increasing recognition of the cosmopolitanism of science.

J. A. T.

OUR BOOK SHELF.

A Short History of Astronomy. By Arthur Berry, M.A. Pp. xxxi + 440. (London: John Murray, 1899.)

READERS of this volume will probably be divided into two classes, those who are pleased with any description of a subject, however disconnected, and those who wish the whole of the ground to be covered, even though many details may only be slightly touched upon. To the former the book will offer much pleasant reading, but it is likely that the latter will be disappointed with the treatment of the matter as it is here presented.

Chapter i. is entitled "Primitive Astronomy," much of the space, however, being taken up by explanations of the various definitions of the celestial sphere. Considering the amount of painstaking labour which has been devoted by many modern inquirers to proving the extent of the astronomical knowledge of the Egyptians and other ancient nations, as evidenced by their temples and monuments, it is rather hard to be told that this is but "a plausible interpretation of these peculiarities."

Chapter ii., dealing with "Greek Astronomy" from 600 B.C. to 400 A.D., is much more readable. Commencing with the introduction of the calendar and its various alterations, the successive celestial systems figured out by Plato, Aristotle, Aristarchus, Hipparchus, Ptolemy, &c., are very lucidly explained. The comparatively slow development of astronomy during the Middle Ages, from 600 A.D. to 1500 A.D., forms the subject of Chapter iii. Towards the end of this period, the first authentic conceptions of the celestial bodies being situated on concentric crystal spheres were enunciated.

The fourth chapter is entirely devoted to the enormous impetus given to astronomical knowledge by the teachings and work of the great Copernicus, extending over the period 1473 A.D. to 1543 A.D. The succeeding five chapters deal with the life-works of Tycho Brahe (1543-1601), Galilei (1564-1642), Kepler (1571-1630), and Newton (1643-1727).

Chapter x. deals with the progress of observational astronomy during the eighteenth century, the chief workers during this period being Flamsteed, Halley, Bradley, Maskelyne and Lacaille; while the following chapter reviews the mathematical aspect of the science for the same epoch, Euler, D'Alembert, Lagrange and Laplace occupying the places of honour.

Chapter xii. is devoted to the work of Herschel from 1738 to 1822. These few chapters are extremely interesting, but it is very disappointing to find that the astronomical progress of the nineteenth century is crowded into the remaining fifty pages. Considering the enormous advances made during this period, this is wholly out of proportion, and in consequence many important matters have either been merely mentioned or omitted altogether. For example, although the book is sufficiently up to date to mention the discovery by Prof. Nasini of a terrestrial gas whose spectrum contained a line probably coincident with the chief coronal line, it is distressing to find no mention whatever made of the gigantic Draper Catalogue of Prof. Pickering dealing with the classification of stars according to their spectra; indeed, the only reference to photographic work on stellar spectra is in connection with motion in the line of sight. Again, the whole matter of the organisation, &c., of the great photographic survey is contained in twelve lines. The mathematical portions of the science are, however, treated much more generously.

The author has attempted a very difficult task in condensing the whole history of astronomy into so small a volume, and it is from this standpoint that the book must be judged. Although to the individual there is much that is unsatisfactory, the work contains a great amount of useful information, which will no doubt cause it to find favour.

Outlines of Physical Chemistry. By A. Reyckler. Translated by John McCrae, Ph.D. Pp. xvi + 276. (London and New York: Whittaker and Co., 1899.)

THE choice and arrangement of the subject-matter of this book is fairly satisfactory. It includes the laws of chemical combination, the atomic hypothesis, the gas laws, vapour density, the specific heat of solids and the periodic system. The second part contains a fuller discussion of the properties of gases and the critical phenomena, the connection between chemical constitution

and the boiling point, volume, refraction and rotation of liquids, and the properties of solutions. The third part deals with thermo- and electro-chemistry and the nature of solutions of salts. The fourth part treats of chemical equilibrium and the velocity of reactions. The treatment of this subject-matter does not, however, appear to be distinguished by any striking originality or other special merit which would warrant the translation of the book. On p. 2, the law of constant proportions is stated thus: "In order to form a substance, it is always necessary to have the same elements united in the same proportions." This is much the same as saying that any two samples of the same kind of matter have the same composition. As Mr. Hartog pointed out in these columns, a correct statement of the law of constant proportions should emphasise the view, upheld by Proust, that the proportions in which two substances combine alter *per saltum*, and that there is not (as Berthollet believed) a series of compounds of all intermediate compositions bridging over the gaps.

It might have been mentioned that the conclusions drawn by Traube from his work on the volumes of liquids (pp. 66-70) are not universally accepted.

The account given of the reasons for assuming the existence of free ions in electrolytes is so incomplete as to be misleading. The work of Clausius is not mentioned, and the considerations which led Arrhenius to his extension of the hypothesis of Clausius do not receive much better treatment.

The evolution of heat accompanying the solution of substances like hydrochloric acid or caustic soda in water is regarded by the author as an insuperable objection to the ionic hypothesis in its usual form. To overcome this objection he proposes a modified hypothesis in which the sodium ion in solutions of sodium salts, for example, is supposed to be combined with an hydroxyl group. In order to explain the phenomena of electrolysis, the charged sodium ion is supposed to be continually passing from one hydroxyl group to another; an exactly similar supposition, however, led Clausius to assume that the ions spend at least some portion of their existence in the free state, so that the author's modification appears to consist in the addition of a new (and unnecessary) hypothesis to the old one. A discussion of this kind is, in any case, somewhat out of place in a book intended for beginners.

The translation might have been better; we do not like "luminary vibration" (p. 81); "the ascension of the mercury" in a thermometer (p. 137); "measurement instruments" (p. 189); "the comparativeveness of our results" (p. 197); "electrolysable compounds" instead of electrolytes; "this scientist" (presumably *ce savant* in the original); "the momentary course of the reaction" (p. 249) instead of the velocity of the reaction at a given instant.

Views on Some of the Phenomena of Nature. By James Walker. Part II. Pp. vi + 187. (London: Swan Sonnenschein and Co., Ltd.)

AMONG the views expressed are that "Light is the sensation produced through the medium of the organ of vision by the action of multitudinous effluvia, exhaled by the sublimation of the incandescent substances which exist in the sun's photosphere, and which are borne into space by an eruptive force, emanating from the contracting body of the sun." After a review of a number of scientific and unscientific statements, the book concludes with the question "As to the 'mode of motion' theory of heat, or the 'wave' theory of both light and heat, of electricity and ether, is it any more than a fiction of the imagination?" Persons who would reply in the negative will be impressed by the arguments of Mr. James Walker.